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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Toshiki TAGUCHI
Serial No.: 09/965,818 ✓
Filed: October 1, 2001
For: COMPOUND HAVING PYRROLE RING AND
LIGHT-EMITTING DEVICE COMPRISING SAME
Art Unit: 1774
Examiner: THOMPSON, CAMIE S

DECLARATION UNDER 37 CFR § 1.132

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

I, Hisashi OKADA do declare and state as follows:

I am a citizen of Japan.

I graduated from Nagoya University, Faculty of Engineering, with a Master's degree in Synthetic Chemistry in March 1984.

Since April 1984 I have been employed by FUJI PHOTO FILM CO., LTD. and have been engaged in research in the field of dyes and other additives for photographic use and organic electroluminescence devices since January 1997.

I am familiar with the Office Action dated April 25, 2003.

In order to demonstrate the unexpected superiority of the present invention over Mori et al., US Patent 5,281,489, the following comparative experiment was conducted by me or under my supervision.

Comparative Experiment

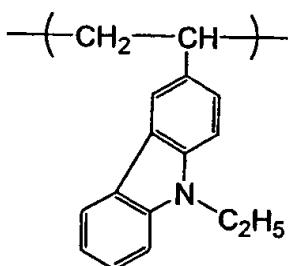
1. Preparation of electroluminescent element of EXAMPLE 1 of Mori et al.
(MORI) (Preparation of Element No. 1)
Procedure described in EXAMPLE 1 of Mori

ITO glass (manufactured and sold by HOYA Corp., Japan), which is a glass substrate prepared by forming an ITO film having a thickness of 1000 Å on a glass plate of 100 x 100 x 1.1 mm in size, was subjected to ultrasonic washing in acetone, followed by air-drying, and then washed with an ultraviolet washing apparatus [model PL-10-110; manufactured by Sen Engineering Co., Ltd., Japan] for 5 minutes. On the ITO glass, a luminescent layer was formed in a thickness of 1000 Å by dip coating of a 1,2-dichloroethane solution containing 1 weight by part of poly(N-vinylcarbazole) (hereafter simply referred to as PVK), having a first oxidation potential of +1.06 V and a first reduction of potential which was less noble as compared to -2.5 (V); Luvican M 170 manufactured and soled by BASF A. G., Germany) as a hole moving and donating agent, 1 part by weight of 2-(4'-tert-butylphenyl)-5-(4"-biphenyl)-1,3,4-oxazole (having a first oxidation potential of +1.76 V and a first reduction potential of -2.04 V; manufactured and soled by Dojindo Laboratories, Japan) as an electron moving and donating agent and 0.02 parts by weight of 3-(2-benzimidazolyl)-7-N,N-diethylaminocoumarin (having a first oxidation potential of 0.86 V and a first reduction potential of -2.01 V) as a fluorescent luminescent agent.

Further, on the layer, metallic magnesium was vapor-deposited through a shadow mask in an area of 0.1 cm² to form a cathode defining the area of the element, which has been named Element No.1. Direct current voltage was applied to thus prepared element using ITO glass as an anode. As a result, green light was emitted. Brightness thereof was 200 cd/m² at 21 V and 10 mA/cm².

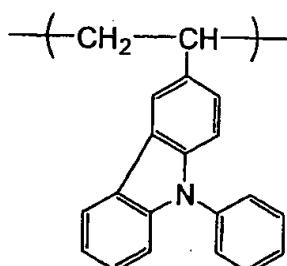
2. Preparation of the element (Element No. 2) using Compound H-11 disclosed in the present application bonding to the main chine at 2-position of a carbazole ring forming a side chain (in the general formula (2)) and the elements (Element Nos. 3-5) using the respective Compounds H-1, H-4 and H-20 of the present invention bonding to the main chine at 3-position of a carbazole ring forming a side chain (in the general formula (2)).

H-1



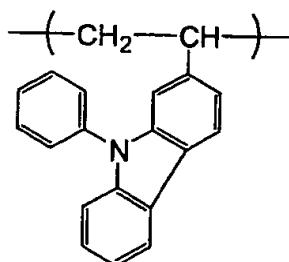
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H-4



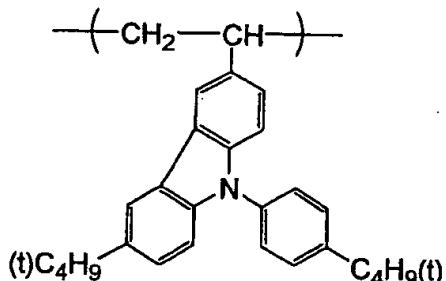
Mw=27000

H-11



Mw=11000

H-20



Mw=10000

The same elements (Elements No. 2-5) as Element No. 1 except for using Compound H-11 as well as Compounds H-1, H-4 and H-20 shown by the above chemical formulae instead of PVK were prepared and the brightness of each of Elements No. 2-5 was measured applying 21 volts in the same manner as described in Preparation of Element No. 1 above. The results are summarized in Table A below.

Table A

Element No.	Compound	Brightness (cd/m^2)	Remarks
1	PVK	200	Comparative Example
2	H-11	800	Comparative Example
3	H-1	1430	Present invention
4	H-4	1650	Present invention
5	H-20	1510	Present invention

3. Discussion

As is clear from Table A above, the elements using the compounds bonding to the main chine at 3-position of a carbazole ring forming a side chain (in the general formula (2)) of the present invention are capable of emitting light with higher brightness at the same voltage compared with the conventional compound having PVK as disclosed in Mori and the compound bonding to the main chine at 2-position of a carbazole ring forming a side chain (in the general formula (2)).

4. Conclusion

Therefore, the amended claim 9 of the present application is not obvious over Mori, and accordingly, we believe that the amended claim 9 of the present application is patentable.

I declare further that all statements made herein on personal knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: August 13, 2003

Hisashi Okada

Hisashi OKADA